MATTOLE RIVER

APPENDIX C: HYDROLOGY

Table of Contents

Chapter I: General Basin Description

Chapter II: Precipitation

Table II-1: List of precipitation gages.

Chart II-1: Precipitation gage period of record. Figure II-1: Location map of precipitation gages.

Chart II-2: Petrolia annual precipitation for Water Years 1959 – 1995.

Chart II-3: Upper Mattole annual precipitation for Water Years 1898 – 1986.

Chapter III: Streamflow

Table III-1: List of streamflow gages.

Chart III-1: Streamflow gage period of record.

Figure III-1: Location map of streamflow gages.

Chart III-2: Mattole River daily discharge for Water Year 2001 (2 gages).

Chart III-3: Mattole River near Petrolia mean, maximum, and minimum daily water temperature for Water Year 2001.

Table III-2: Mattole River near Petrolia mean monthly discharge for Water Years 1912 - 1913 and 1951 – 2000.

Chart III-4: Mattole River near Petrolia mean, maximum, and minimum daily discharge for Water Years 1912 - 1913 and 1951 – 2000.

Chart III-5: Mattole River near Petrolia annual yield for Water Years 1952 – 2000.

Chart III-6: Mattole River near Petrolia daily discharge duration for Water Years 1912 - 1913 and 1951 - 2000.

Table III-3: Mattole River near Petrolia annual peak discharge frequency analysis for Water Years 1912 - 1913 and 1951 – 2000.

Chart III-7: Mattole River near Petrolia annual peak discharge for Water Years 1951 – 2000.

Chart III-8: Mattole River near Petrolia annual peak flow return period for Water Years 1912 - 1913 and 1951 - 2000.

Table III-4: Mattole River near Petrolia annual 7-day running average low-flow frequency analysis for Water Years 1912 - 1913 and 1951 – 2000.

Chart III-9: Mattole River near Petrolia annual 7-day running average low-flow for Water Years 1951 - 2000.

Chart III-10: Mattole River near Petrolia annual 7-day running average low-flow return period for Water Years 1912 - 1913 and 1951 – 2000.

Chapter IV: Surface Water Rights and Water Use

Table IV-1: List of SWRCB WRIMS surface water rights.

Figure IV-1: Location map of surface water rights point of diversion.

Table IV-2: Irrigated agricultural land, water source, and water use for year 1996.

Table IV-3: Population and water use within the Mattole River subbasins for year 2000.

I. GENERAL BASIN DESCRIPTION

The Mattole River is located in northwestern California about 40 miles south of Eureka in Humboldt and Mendocino Counties. The Bear River borders the basin to the north and the South Fork Eel River to the east. A general location map is shown in Figure 1 of the synthesis report. The Mattole River drainage basin is about 296 square miles. The basin varies in width from 4 to 12 miles and is about 36 miles long. The basin is steep mountainous terrain with a series of ridges within the basin including the King Range. Topographic elevations vary from sea level to 4,088 feet at Kings Peak. The stream channel of the Mattole River is about 62 miles long and rises gradually from sea level to 50 feet at Petrolia, 320 feet at Honeydew, 600 feet at Ettersburg, 1,000 feet at Whitethorn, and to about 1,350 feet at Four Corners near the headwaters in Mendocino County.

Starting as a small stream in northern Mendocino County flowing almost due east through mild gradients, the river turns north entering Humbolt County and then west joined by approximately 74 tributaries. The river flows into an abbreviated estuary at the mouth before entering the Pacific Ocean about 10 miles south of Cape Mendocino. The Mattole River flows the year round but with tremendous differences between the summer and winter.

The basin is sparsely populated with a permanent population according to the 2000 census of about 1,200 people or about 4 capita per square mile, centered around the communities of Petrolia, Honeydew, and Whitethorn.

The climate within the basin is relatively moderate with a large portion being influenced by the Pacific Ocean. Temperatures along the coast regions vary between 40 and 60 degrees F the year round with the inland portions of the basin ranging from below freezing during the winter and up to 100 degrees F in the summer. The basin has one of the highest annual precipitation amounts in California with a mean rainfall of about 81 inches, a far majority occurring during the months of November through April.

Only one streamflow gage, Mattole River near Petrolia, USGS station #11469000, operated for a significant period within the basin (November 1911 – December 1913 and December 1950 – present). This gage is one of the few within the North Coast region that has operated continuously for the past 50 years. The gage is located near the town of Petrolia and measures the run-off from 245 or 83% percent of the total 296 square mile Mattole River Basin.

DWR's Statewide Planning Program delineates the Mattole River Basin within the North Coast Hydrologic Region (HR), the Coastal (#03) Planning Subarea (PSA), and the Mattole-Bear (#27) Detailed Analysis Unit (DAU). The USGS delineates the Mattole River Basin within Hydrologic Unit #18010107.

The Mattole River assessment team has divided the basin into five principal subbasins for assessment purposes. These subbasins, comprised of two or more of the CalWater 2.2a Planning Watersheds, are as follows: Northern (33 percent of drainage), We stern (30), Eastern (27), Southern (9), and Estuary (1).

II. PRECIPITATION

The climate within the Mattole River Basin is characterized as dry with warm temperatures in the summer but wet with profuse rainfall during the winter. Winter storms move inland in a northeasterly direction from the Pacific Ocean. Storms must first pass over the 1,000 to 2,000 foot Cooskie Ridge before reaching Honeydew and another 1,000 to 1,500 foot increase in elevation to cross the Bull Creek divide through Panther Gap to pass into the South Fork Eel River drainage. It is this orographic uplift in such a short distance from the coastline that results in heavy rainfall in the Honeydew area. A small portion of the precipitation may fall as snow in the higher elevations, but ridgeline elevations are less than 3,000 feet, and snow accumulations are minimal.

There are or were 12 precipitation gages located within the Mattole River Basin. Five of these gages were in operation longer than 20 years. There are or were another eight gages located within 10 miles of the basin boundary. Table II-1 contains the gage identifiers, location, period of record, annual, and maximum daily precipitation for the long-term gages within or near the Mattole River Basin. The Scotia gage is the only gage listed in Table II-1 that is currently operating. Chart II-1 graphically illustrates the period of record for the gages and Figure II-1 provides a location map. The mean annual precipitation within the basin varies from 60 inches near the coast to 100 inches in the higher elevations south of Honeydew. The maximum recorded annual precipitation within the basin was 255.92 inches at the Wilder Ridge gage in 1983 and the minimum was 25.43 inches at the Upper Mattole gage in 1977.

Two of the longest operating precipitation gages within the Mattole River Basin are the Petrolia gage located at Petrolia at an elevation of 175 feet and the Upper Mattole gage located at an elevation of 255 feet. Chart II-2 shows the annual precipitation at the Petrolia gage along with the cumulative departure from the mean for water years 1959 - 1995. The mean precipitation for the 37-year record is 62.43 inches. The wettest year was 1983 with 109.76 inches of rainfall. The driest year was 1977 with 27.24 inches of rainfall. Chart II-3 shows the annual precipitation at the Upper Mattole rain gage along with the cumulative departure from the mean for water years 1898 - 1986. The mean precipitation for the 98-year record is 78.70 inches. The wettest year was 1904 with 130.64 inches of rainfall. The driest year was 1977 with 25.43 inches of rainfall.

The historic precipitation data within the basin contain many short-term wet (1993 – 1999) and dry (1987 – 1992) periods. However, long-term precipitation trends within the basin are more difficult to assess due to the general lack of spatial and temporal data. Maury Roos, the Chief Hydrologist for DWR, was requested to comment on long-term precipitation trends over the last 50 to 100 years for the North Coast region. The following are some of his comments. "Precipitation is highly variable from year to year, so it is easy to get apparent trends if one starts or ends in a wet or dry period. James Goodrich (hydrology consultant and retired DWR hydrologist) has run 100 years of long-term records to look for statewide or regional trends. If one takes the numerical results for his latest statewide sample and tries a simple regression line, it will show a small apparent increase of around five percent during the twentieth century. I doubt if it is significant; we are probably seeing the bulge of five or six good water years in the latter half of the 1990s. In fact, just adding 2001 seems to have changed the slope, in inches, from 0.015 to 0.012. A similar chart ending in 1995 showed a slight negative slope. A seven-station chart for the North Coast region with departure from average shows no real trend since the mid-1930s. One of the seven stations is Fort Ross and I am suspicious of its 1890 to 1920 record."

Table II-1: Existing and discontinued long-term precipitation gages within or near the Mattole River Basin.

	EXISTING AND DISCONTINUED LONG-TERM PRECIPITATION GAGES LOCATED WITHIN OR NEAR THE MATTOLE RIVER BASIN													
Gage Name	Upper Mattole 1/	Petrolia 1/	Whitethorn 1/	Honeydew 2WSW 1/	Honeydew Store 1/	Scotia	Burlington State Park	Cape Mendocino Light House						
Gage #	F70	F70	F70	F60	F70	F60	F60	F70						
	9177 00	6835 01	9654 00	4074 00	4074 10	8045 00	1202 00	1504 00						
			C	SAGE LOCAT	ION									
County Humboldt Humboldt Humboldt Humboldt Humboldt Humboldt Humboldt Humboldt														
Longitude	124.183	124.280	123.937	124.150	124.122	124.100	123.907	124.405						
Latitude	40.250	40.234	40.022	40.238	40.244	40.483	40.308	40.440						
Elevation	255	175	1050	380	339	140	200	425						
			PE	RIOD OF RE	CORD									
Begin	1898	1958	1965	1954	1975	1927	1950	1895						
End	1986	1995 2/	1990	1978 3/	1994 4/	present	1998	1943 5/						
			ANN	UAL PRECIP	ITATION									
Average	78.70	62.43	84.35	101.65	77.33	48.19	65.73	40.11						
Maximum	130.64	109.76	144.05	174.40	159.21	84.45	118.57	64.10						
Year	1904	1983	1983	1958	1983	1983	1983	1907						
Minimum	25.43	27.24	35.37	31.05	33.05	19.71	27.29	14.78						
Year	1977	1977	1977	1977	1977	1977	1977	1931						
		AN	INUAL 24-HO	UR MAXIMU	M PRECIPITA	ATION								
Average	5.13	3.94	5.42	7.71	6.88	3.22	4.39	1.94						
Maximum	9.35	6.42	9.61	13.65	11.40	5.95	7.40	3.30						
Year	1940	1995	1966	1956	1985	1940	1974	1927						
Minimum	1.40	1.97	2.09	5.00	2.60	1.17	1.78	1.00						
Year	1977	1977	1977	1978	1992	1977	1977	1930						
Notes: 1/	Gage located wit	hin the Mattole	watershed.	5/	Inactive 1910 - 1	1912, 1914 & 191	9 - 1924.							

4/ Inactive 1986 - 1989.

Chart II-1: Period of record for precipitation gages located within or near the Mattole River Basin.

EXI	EXISTING AND DISCONTINUED LONG-TERM PRECIPITATION GAGES LOCATED WITHIN OR NEAR THE MATTOLE RIVER BASIN													
Gage						P	eriod o	f Reco	rd					
Name	1870's	1880's	1890's	1900's	1910's	1920's	1930's	1940's	1950's	1960's	1970's	1980's	1990's	2000's
Upper Mattole														
Petrolia														
Whitethorn														
Honeydew 2WSW														
Honeydew Store														
Scotia														
Burlington State Park														
Cape Mendocino LH														

^{2/} Inactive 1970.

^{3/} Inactive 1972 - 1974.

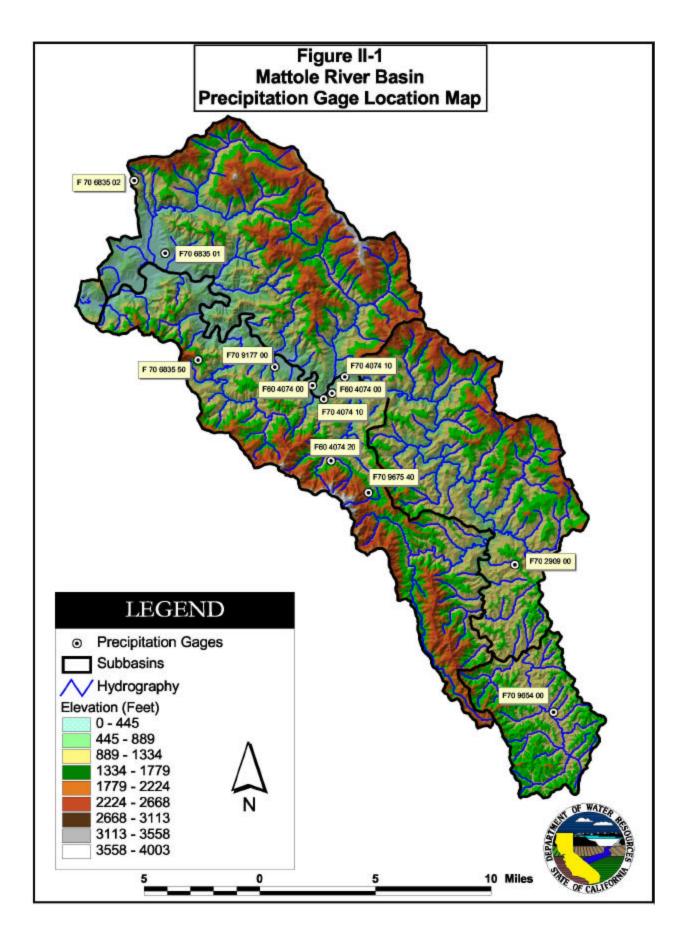


Chart II-2: Annual precipitation and cumulative departure from the mean for the Petrolia gage, DWR F70 6835 01, for Water Years 1959 - 1995.

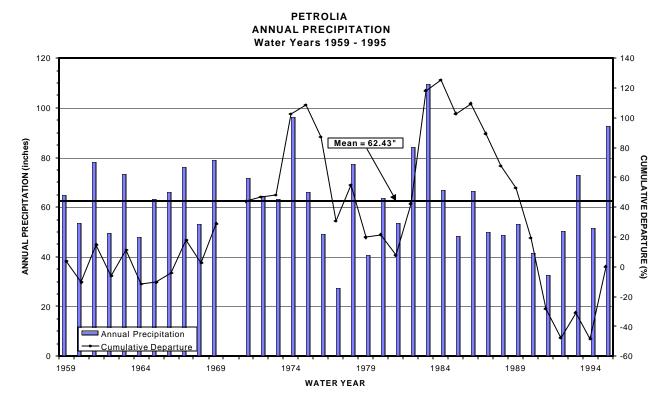
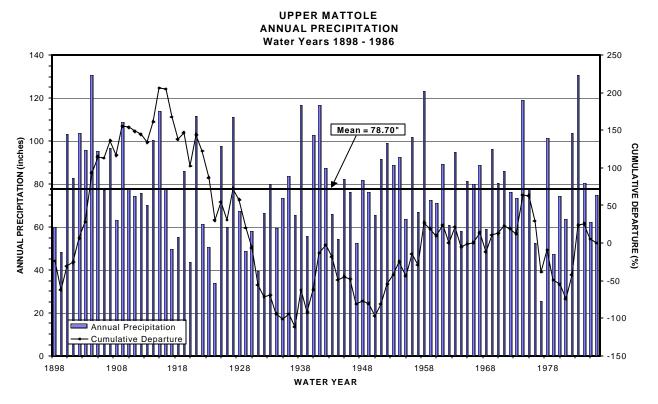


Chart II-3: Annual precipitation and cumulative departure from the mean for the Upper Mattole gage, DWR F70 9177 00, for Water Years 1898 - 1986.



III. STREAMFLOW

Streamflow data are an important component in determining the existing conditions and assisting assessment, restoration, and management activities in North Coast river basins. Streamflow can be a limiting factor for anadromous fisheries affecting migration and the quantity and quality of spawning, rearing, and refugia areas. Streamflow also has a direct affect on other factors such as water temperature, dissolved oxygen, and sediment and chemical transport. Streamflow data are required to quantify stream sediment and chemical transport total loads and for calibrating hydrologic or hydraulic computer models. Although floodplain management and design and construction projects such as bridges and road crossings, water diversions, fish ladders and screens, and streambank stabilization are not included in NCWAP, streamflow data is a significant benefit to these as well as other activities including SWRCB water right application and license reviews and judicial water supply allocations.

A common problem for watershed managers is the lack of data and the inability to compare current flow conditions to historic conditions. If long-term data collection programs are not established and supported, resources managers are forced to sometimes make profound policy, management, and operational decisions based on limited scientific data.

Due to the general lack of streamflow data available within the North Coast region, funding was provided through NCWAP to install and operate streamflow gaging stations. NCWAP will also provide for the continued operation of selected existing streamflow gaging stations that are subject to discontinuation due to funding reductions. Additional support for new streamflow gaging station installation and operation within North Coast river basins will be provided by the SWRCB Surface Water Ambient Monitoring Program (SWAMP). All new streamflow gaging stations will be equipped with water temperature sensors and some with other water quality sensors for measuring parameters such as turbidity, dissolved oxygen, pH, and conductance. Existing stations may also be equipped with additional water quality sensors. Selected stations will be equipped with telemetry to provide a portion of the collected data on a real-time basis via the California Data Exchange Center (CDEC) web site. Real-time streamflow and water quality data will help NCWAP agencies and other stakeholders identify event sampling opportunities or hazardous conditions for fish survival. Flood forecasters and emergency response personnel will also benefit from this real-time streamflow data.

Selection of sites, data collection type, and period of station operation will be based on available funding, existing stations, resumption of discontinued stations for historic comparisons, access, favorable site conditions, and special NCWAP or SWAMP identified needs. Stations located at the terminus of the basins or major subbasins where none currently exist will be a priority. Some stations will be operated for the long-term for trend and base correlation analysis, while others may only be operated for short periods. Electronic multiple parameter data loggers will be used at all stations to collect detailed time series data, normally every 15 minutes or hourly, for all sensors.

DWR and the USGS will work cooperatively to install and operate the new streamflow gaging stations. Data quality assurance and control techniques developed by the USGS will be employed. The stations will be constructed to withstand substantial flood events and incidental vandalism. Stations installed for short-term operation will be constructed with the assumption that data collection may be resumed at a later date. About nine to 12 direct stream discharge measurements along with simultaneous water stage (elevation) data over a wide range of water stages will normally be performed annually at each station. High discharge measurements may require the installation of cableway systems if bridges are not located nearby or if

measurements by boat are impractical. Multiple direct field measurements of water stage and water quality parameters will also be performed to verify and calibrate the station sensors.

Water stage and water quality time series data will normally be downloaded from the station data loggers and then uploaded into a database and reviewed and edited for accuracy on a monthly basis. Time series streamflow data will be determined by correlating the direct discharge measurements with the simultaneous water stage data. This stage vs. discharge relationship or rating curve is then applied to the stage recordings from the station's stage sensor and data logger to compute streamflow for the same time series interval as water stage, normally every 15 minutes. Once the rating curves are developed, real-time flow data will be provided over the Internet via the CDEC web site for those stations equipped with telemetry. Real-time telemetry also allows the station's operator to remotely monitor the operation of the station allowing a timely response to station malfunctions. Real-time data is not reviewed and edited for inaccuracies such as telemetry transmission error, sensor drift or malfunction, or discharge rating curve shift and is considered preliminary and subject to revision. The reviewed and finalized data for the October through September water year will usually be available about three to six months after the end of the water year.

Similar to other basins within the North Coast, only a few streamflow gaging stations have historically operated within the Mattole River Basin. Only one gage, Mattole River near Petrolia, was operating at the end of water year 2000 and was scheduled to be discontinued due to budget reductions. Beginning in water year 2001, NCWAP began funding this streamflow gage. To gain additional streamflow data, another gage was installed for NCWAP in June 2001 on the Mattole River near Ettersburg in the upper portion of the basin. The gage will measure the discharge from 58 or 20% of the entire 296 square mile Mattole River Basin. The new gage was also equipped with a water temperature sensor. A list of the existing and discontinued streamflow gaging stations along with their location, flow data type, and period of record is shown in Table III-1. Chart III-1 graphically illustrates the period of record. A location map is provided in Figure III-1.

Installation of the new gage by DWR and the USGS was completed in June 2001. The USGS operated the gage during the remainder of water year 2001 and have provided final data for stage, discharge, and water temperature. It is usual USGS practice to estimate mean daily data during periods of sensor malfunction. The final edited and reviewed data by the USGS for the entire water year is usually available three to six months after the end of the water year. Chart III-2 graphically shows the daily flow for the Petrolia and Ettersburg gages for water year 2001. Chart III-3 shows the daily mean, maximum, and minimum water temperatures for the Ettersburg gage.

Table III-1: Existing and discontinued streamflow gaging stations within the Mattole River Basin.

E	MATTOLE RIVER EXISTING AND DISCONTINUED STREAMFLOW GAGING STATIONS													
Operating Agency	Gage Number	Gage Name	1/ Data Type	Drainage Area (sq. mi.)	Elevation (feet)	County	Period of Record							
USGS	11468880	Painter Creek near Redway	QP	0.64	950	Humboldt	2/62 - 1/73							
USGS	11468900	Mattole River near Ettersburg 2/	QC	58.1	593	Humboldt	7/01 - present							
USGS	11468990	Honeydew Creek at Honeydew	QC	14.9	400	Humboldt	1/73 - 9/77							
USGS	11469000	Mattole River near Petrolia 3/	QC	245	60	Humboldt	11/11 - 12/13, 12/50 - present							
USGS	11469500	N. F. Mattole River at Petrolia	QC	37.6	50	Humboldt	7/51 - 9/57							

Notes: 1/ QP = annual peak flow only. QC = continuous flow record.

Chart III-1: Period of record for streamflow gaging stations within the Mattole Basin.

MATTOLE RIVER EXISTING AND DISCONTINUED STREAMFLOW GAGING STATIONS												
USGS Period of Record												
GAGE#	1950's	1960's	1970's	1980's	1990's	2000's						
11468880												
11468900												
11468990												
11469000												
11469500												

^{2/} New station installed and operated for NCWAP.

^{3/} Station operation funded by NCWAP beginning in October 2000.

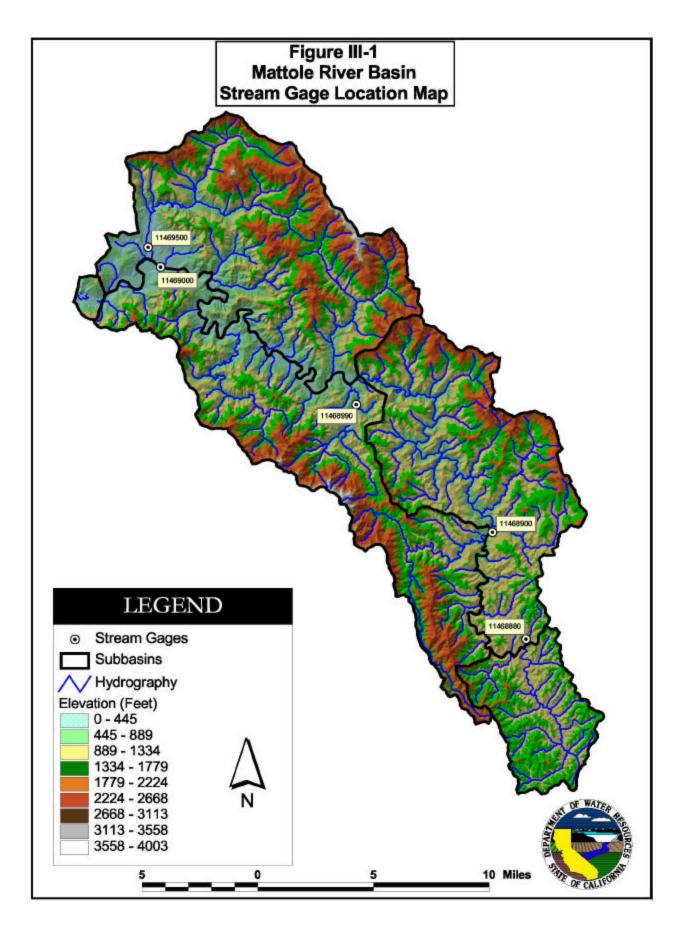


Chart III-2: Daily discharge for the two currently operating streamflow gages within the Mattole River Basin for Water Year 2001.

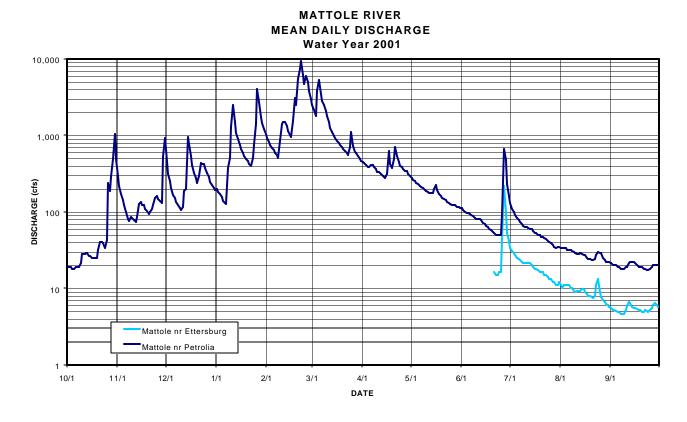
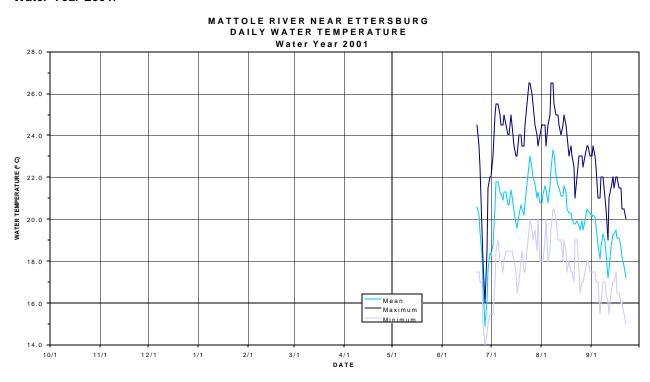


Chart III-3: Daily mean, maximum, and minimum water temperature for the new Ettersburg gage for Water Year 2001.



The Mattole River near Petrolia gage has operated for a statistically significant period (November 1911 – December 1913 and December 1950 – present). This station has one of the longest continuous periods of record of all existing and discontinued streamflow gages within the North Coast region and can assist in streamflow trend, baseline, or regional regression analysis. The station is located approximately one mile upstream from the town of Petrolia on the main stem of the Mattole River and measures the runoff from 245 or 83% of the total 296 square mile Mattole River Basin. A summary and statistical analysis of the flow data for this station follows.

Table III-2 shows the mean monthly discharge for the period of record. Chart III-4 graphically illustrates the mean, maximum, and minimum daily discharge for each day of the water year for the period of record. Chart III-5 shows the annual yield or runoff volume in acre-feet for water years 1952 – 2000 with the five-year moving average superimposed. The moving average describes the general trend of a series. The chart indicates a slight decline with time in annual yield during the 50-year period and a much higher degree of variation during the last 25 years. Chart III-6 presents daily discharge duration for the period of record.

A frequency analysis for annual peak discharge and low-flow was completed using the Methodology from the USGS Bulletin number 17B, "Techniques of Water-Resources Investigation of the USGS" and Ven Te Chow's "Handbook of Hydrology". The annual instantaneous series data was used for the peak discharge frequency. The Gringorten plotting position equation was selected, as it tended to give better results when using the normal distribution. Table III-3 shows the ranked data, plotting position, and frequencies. Chart III-7 shows the peak discharge for water years 1951 – 2000. Peak discharge versus return period is shown in Chart III-8. The return period, also referred to as the recurrence interval, is a statistical representation of the number of years within which a given event will be equaled or exceeded.

The low-flow frequency analysis was similar to the peak discharge analysis except the discharge values were determined by calculating the minimum seven-day running average of the mean daily discharge for each water year. These values were then used to complete the frequency analysis described above. Table III-4 shows the ranked data, plotting position, and frequencies. Chart III-9 shows the seven-day low-flow for the period of record with the five-year moving average. The low-flow discharge versus return period is shown in Chart III-10.

The two highest flood events during the 52-year record of the gage occurred December 22, 1955 at 90,400 cfs and December 22, 1964 at 78,500 cfs with computed return periods using the normal distribution of about 200 and 100 years, respectively. Nine other annual peak events during the operation of the gage exceeded 50,000 cfs. The five-year moving average trend line shown in Chart III-7 indicates a slight decline with time in the annual peak discharge.

The annual minimum seven-day running low-flow ranged from 42.3 cfs in 1963 to 17.0 cfs in 1977. The five-year moving average trend line shown in Chart III-9 also indicates a slight overall decline in low-flow since the operation of the gage was resumed in 1951. This may be a result of a general increase in water use within the basin for domestic or agricultural purposes as the population increased during the last 50 years.

Long-term annual and seasonal trends in streamflow within the basin are difficult to assess due to the general lack of spatial and temporal streamflow data. Similar to precipitation data, the existing long-term streamflow data within the region do not show any distinct long-term increase or decrease in annual runoff.

Affects on unit discharge hydrographs due to changes in land use or geomorphology within the basin can not be directly assessed with existing data. In general, native vegetation removal as a result of timber harvesting, fire, or agricultural or urban development tends to produce runoff from precipitation quicker in time and greater in peak and volume. Changes in runoff characteristics can currently only be assessed by the use of rainfall/runoff models. However, the accuracy of any model relies on the quantity and quality of spatial and temporal field collected data within at least the surrounding region for calibration purposes.

The continued operation of the streamflow gaging station installed within the Mattole River Basin for NCWAP in Water Year 2001 and other existing streamflow and precipitation gages within the North Coast region should be considered as part of any watershed management or fish restoration program.

Table III-2: Summary of monthly mean discharge for Mattole River near Petrolia, USGS station #11469000, for Water Years 1912 – 1913 and 1951 - 2000.

MATTOLE RIVER NEAR PETROLIA **USGS STATION #11469000** MEAN MONTHLY DISCHARGE AND ANNUAL YIELD WATER YEARS 1912-1913 and 1951-2000 (units in cfs. NR = no record)

	(units in cfs, NR = no record) Month												F				
Water Year	Oct	Nov	Dec	Jan	Feb	Mor Mar	nth Apr	May	Jun	Jul	Aug	Sep	Min	Max	Mean	WY Total	Yield (ac-ft)
1912	NR	NR	299	4.496	3.032	2.107	1.012	1.693	436	182	90	179	NR	NR	NR	NR	NR
1913	191	4,022	2,966	5,545	576	675	1,358	417	199	92	41	35	35	5,545	1,343	16,116	976,376
1951	NR	NR	4,400	4,431	3,915	1,421	308	494	148	67	37	28	NR	NR	NR	ŇR	NR
1952	210	2,392	5,138	5,072	3,834	1,770	487	494	178	96	50	32	32	5,138	1,646	19,752	1,193,169
1953	43	117	3,853	7,200	823	1,900	1,027	1,366	532	166	104	67	43	7,200	1,433	17,196	1,049,012
1954	181	2,490	1,624	7,186	2,869	2,051	2,191	297	150	73	77	80	73	7,186	1,606	19,269	1,158,014
1955	152	1,193	1,991	1,821	591	445	1,975	583	165	83	44	38	38	1,991	757	9,081	548,156
1956	39	531	8,340	5,745	3,128	1,429	237	259	112	64	38	32	32	8,340	1,663	19,954	1,212,692
1957	281	240	190	1,246	2,974	3,573	1,073	1,611	357	130	64	136	64	3,573	990	11,875	708,891
1958	1,167	1,726	3,251	4,892	10,713	1,860	2,928	289	144	64	39	43	39	10,713	2,260	27,115	1,593,888
1959	44	263 42	475 141	5,481 1.741	4,514	809 3.389	546	176	85	49	30	120	30 42	5,481	1,049	12,592	745,380
1960 1961	56 78	1,674	3,547	1,741	4,556 5,325	3,389	1,303 905	1,842	550 258	126 98	64 56	46 46	46	4,556 5,325	1,155 1,498	13,855 17,975	829,983 1,067,810
1962	78	572	1,615	938	4,136	1,990	471	240	109	67	77	67	67	4,136	863	10,358	609,838
1963	1.560	1.885	2.588	935	3,951	2.250	5.225	1.263	233	116	60	44	44	5.225	1.676	20.110	1.198.364
1964	625	3,798	831	3,964	872	862	281	161	97	55	36	26	26	3,964	967	11,608	701,942
1965	79	1.634	7.745	4.084	883	289	2.258	428	141	68	45	34	34	7,745	1,474	17.687	1,074,214
1966	40	1,583	1,644	4,892	1,940	3,147	725	215	98	52	39	35	35	4,892	1,201	14,408	869,532
1967	30	2,695	4,211	4,135	1,599	2,516	2,192	739	211	88	47	40	30	4,211	1,542	18,503	1,118,017
1968	109	243	1,177	3,399	3,099	1,913	407	197	105	59	92	52	52	3,399	904	10,852	653,351
1969	152	869	5,368	4,872	3,959	1,544	699	329	156	80	46	40	40	5,368	1,510	18,116	1,086,839
1970	107	416	6,004	8,928	2,042	1,034	286	151	76	39	26	22	22	8,928	1,594	19,130	1,162,512
1971	126	3,481	5,716	4,724	494	3,227	1,332	330	138	76	44	49	44	5,716	1,645	19,736	1,200,664
1972	68	1,752	2,841	3,150	3,467	2,663	1,351	418	177	66	41	65	41	3,467	1,338	16,058	966,994
1973	102	1,057	3,856	5,239	2,696	2,013	658	259	106	47	30	123	30	5,239	1,349	16,187	975,380
1974	551	7,159	4,428	6,115	1,987	4,350	2,258	277	134	89	43	30	30	7,159	2,285	27,421	1,655,203
1975	33	112	1,197	1,695	8,112	6,877	987	476	172	88	44	35	33	8,112	1,652	19,827	1,168,276
1976	309	956	1,918	782	3,113	1,534	1,267	288	125	59	51	30	30	3,113	869	10,431	624,325
1977 1978	30 214	74 1,330	40 6.330	135 8,698	243 4,322	678 1.925	167 1.341	166 411	69 157	31 77	23 59	237 166	23 59	678 8,698	158 2,086	1,893 25.031	113,841 1.507.414
1978	51	68	95	1,297	2,812	1,925	895	1,019	197	103	47	52	47	2,812	693	8,322	492,545
1980	758	2.179	1.641	3.360	3.290	2.504	1.219	358	157	79	40	28	28	3.360	1.301	15.612	939.794
1981	39	125	1,921	3,092	2,414	1,758	658	285	135	63	36	64	36	3,092	882	10,589	634,760
1982	416	4,380	6,172	2,160	3,285	2,223	4,529	349	150	75	40	32	32	6,172	1,984	23,811	1.426.475
1983	387	2,488	6,887	3,354	6,460	7,929	2,455	1,177	269	127	164	206	127	7,929	2,659	31,902	1,912,403
1984	123	4,086	6,842	1,004	2,027	1,681	984	535	214	86	50	34	34	6,842	1,472	17,666	1,067,659
1985	106	4,973	1,602	493	1,462	1,043	576	181	101	47	32	31	31	4,973	887	10,646	634,653
1986	156	190	1,236	3,356	8,524	3,027	373	427	128	61	34	191	34	8,524	1,475	17,703	1,036,028
1987	204	249	903	2,650	2,729	3,299	388	198	90	47	34	26	26	3,299	901	10,816	647,328
1988	24	102	4,782	3,563	515	187	166	239	432	80	39	26	24	4,782	846	10,154	620,836
1989	39	2,380	1,433	1,632	856	4,775	1,051	249	115	66	37	28	28	4,775	1,055	12,660	766,274
1990	246	116	78	2,094	1,561	964	253	1,219	765	149	69	46	46	2,094	630	7,559	453,185
1991	41	62	102	268	710	2,593	533	208	102	51	54	64	41	2,593	399	4,787	288,599
1992	53	97	222	867	3,459	1,851	1,052	300	132	84	36	28	28	3,459	682	8,180	486,651
1993 1994	100 54	252 74	2,659 2,221	4,700 2,233	2,004	2,449 948	2,083 489	989 300	1,058 130	191 60	82 31	49 25	49 25	4,700 2,381	1,385 745	16,615 8,945	1,002,883 534,417
1994	25	424	1,305	8,709	2,381	5,310	1,676	679	230	102	48	37	25	8,709	1,727	20,726	1,256,741
1995	31	424	3.278	3.709	3,739	2,176	1,676	1,195	356	102	48	46	31	3,739	1,727	16,488	994,580
1996	56	968	7,667	4,788	1,254	814	582	293	166	64	41	48	41	7,667	1,374	16,741	1,018,431
1998	110	886	1,899	6,672	7,160	3,477	1,363	455	252	102	47	33	33	7,160	1,871	22.455	1,333,083
1999	49	2,198	2,537	2,059	5,841	3,385	1,553	327	133	57	38	24	24	5,841	1,517	18,201	1,076,638
2000	53	782	922	4,099	5.411	2.179	631	350	129	57	32	24	24	5.411	1.222	14,669	866,678
				.,,,,,,	, ,,,,,	,				Ų.						,000	200,0.0
Min	24	42	40	135	243	187	166	151	69	31	23	22	22	678	158	1,893	113,841
Max	1,560	7,159	8,340	8,928	10,713	7,929	5,225	1,842	1,058	191	164	237	127	10,713	2,659	31,902	1,912,403
Mean	196	1,429	2,887	3,639	3,151	2,305	1,202	544	213	83	50	60	39	5,308	1,312	15,748	945,214
Mean	190	1,429	2,007	3,039	3,131	2,303	1,202	544	213	ಂತ	50	00	39	5,308	1,312	15,748	940,∠14

Chart III-4: Mean, maximum, and minimum daily discharge for each day of the water year for Mattole River near Petrolia, USGS station #11469000, for Water Years 1912 – 1913 and 1951 – 2000.

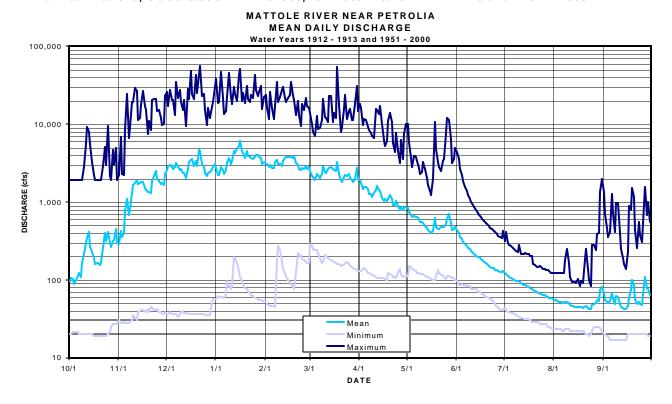


Chart III-5: Annual yield and the 5-year moving average for Mattole River near Petrolia, USGS station #11469000, for Water Years 1952 – 2000.

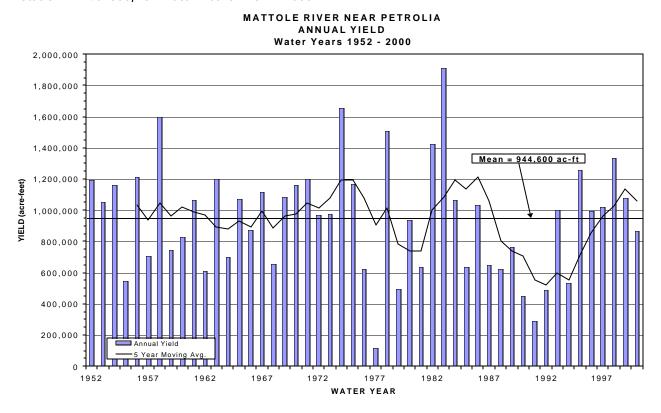


Chart III-6: Daily discharge duration for Mattole River near Petrolia, USGS station #11469000, for Water Years 1912 – 1913 and 1951 – 2000.

MATTOLE RIVER NEAR PETROLIA MEAN DAILY DISCHARGE DURATION Water Years 1912 - 1913 and 1951 - 2000

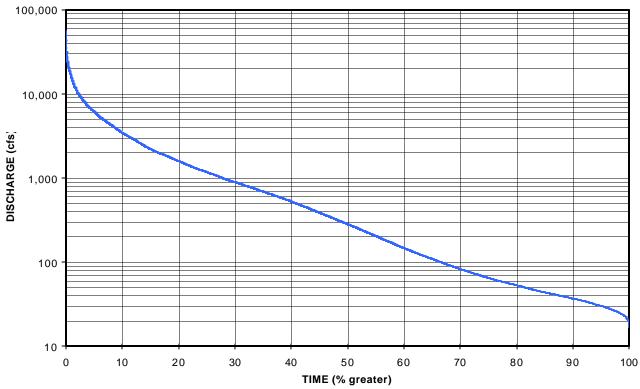


Table III-3: Annual peak instantaneous discharge and frequency analysis for Mattole River near Petrolia, USGS station #11469000, for Water Years 1912 – 1913 and 1951 – 2000.

				,	USGS #11 JENCY ANA	
					1951-2000	
	Ranked Dat	a	Grinaor	ten Plottina	Position	Statistics
		Peak	Return		_	
Dant	Water	Discharge	Period		Exceedance	Statistical Moments of
Rank	Year	(cfs)	(Years)	Frequency	Probability	Discharge
1	1956	90400	93.07	0.989	0.011	
3	1965 1974	78500 62100	33.41 20.36	0.970 0.951	0.030	Mean = 37791.54
4	1960	62000	14.64	0.931	0.068	Weall = 37791.34
5	1975	61200	11.43	0.913	0.087	SDEV = 17555.90
6	1995	58700	9.37	0.893	0.107	
7	1983	57100	7.95	0.874	0.126	Variance = 3.08E+08
8	1966	56900	6.89	0.855	0.145	0.54
9 10	1982	55500	6.09 5.45	0.836	0.164	Skew = 0.54
11	1969 1970	53800 52800	4.94	0.817 0.797	0.183	
12	1986	48400	4.51	0.778	0.222	
13	1912	48000	4.15	0.759	0.241	
14	1984	47000	3.84	0.740	0.260	
15	1971	46900	3.58	0.721	0.279	
16	1961	46000	3.35	0.701	0.299	
17	1972	46000	3.15	0.682	0.318	
18 19	1993 1997	45400 45100	2.97 2.81	0.663 0.644	0.337 0.356	
20	1985	44600	2.66	0.625	0.375	
21	1964	43200	2.54	0.606	0.394	
22	1967	42400	2.42	0.586	0.414	
23	1958	41400	2.31	0.567	0.433	
24	1978	41200	2.21	0.548	0.452	
25	1959	37900	2.12	0.529	0.471	
26	1973	34400	2.04	0.510	0.490	
27 28	1951 1954	34000 34000	1.96 1.89	0.490 0.471	0.510 0.529	
29	1968	33700	1.82	0.452	0.548	
30	1952	33600	1.76	0.433	0.567	
31	1996	32300	1.71	0.414	0.586	
32	1913	30000	1.65	0.394	0.606	
33	1998	29500	1.60	0.375	0.625	
34	1981	28400	1.55	0.356	0.644	
35 36	1953 1989	28300 28200	1.51 1.47	0.337	0.663 0.682	
37	1963	28000	1.43	0.299	0.701	
38	2000	27900	1.39	0.279	0.721	
39	1988	27500	1.35	0.260	0.740	
40	1994	27200	1.32	0.241	0.759	
41	1976	23100	1.29	0.222	0.778	
42	1999	22900	1.25	0.203	0.797	
43 44	1957 1990	22300 19100	1.22	0.183 0.164	0.817 0.836	
45	1980	18500	1.17	0.164	0.855	
46	1962	17800	1.14	0.126	0.874	
47	1955	16800	1.12	0.107	0.893	
48	1979	16500	1.10	0.087	0.913	
49	1987	15000	1.07	0.068	0.932	
50	1992	11500	1.05	0.049	0.951	
51	1991	8880	1.03	0.030	0.970	
52	1977	3280	1.01	0.011	0.989	
	<u>Nor</u>	mal Distr	ibution C	omputed I	Return Peri	<u>ods</u>
			Years	(cfs)		
			100	78,600		
			50	73,900		
			25			
				68,500		
			10	60,300		
			5	52,600		
			2	37,800		

Chart III-7: Annual instantaneous peak discharge and the 5-year moving average for Mattole River near Petrolia, USGS station #11469000, for Water Years 1951 – 2000.



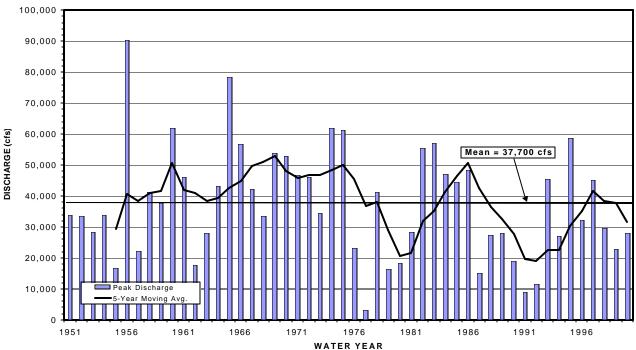


Chart III-8: Annual peak instantaneous discharge return period for Mattole River near Petrolia, USGS station #1146900, for Water Years 1912 – 1913 and 1951 – 2000.

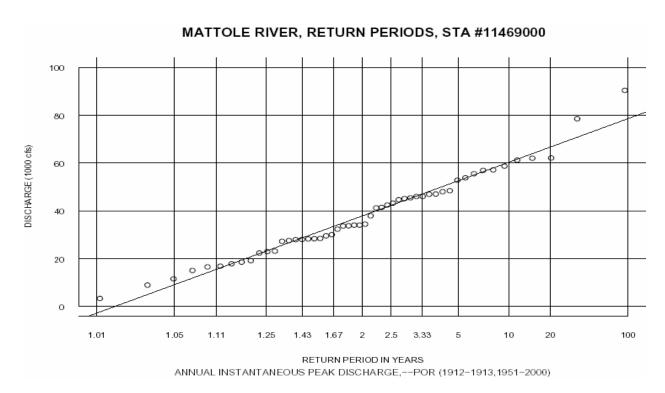


Table III-4: Annual minimum seven-day running low flow and frequency analysis for Mattole River near Petrolia, USGS station #11469000, for Water Years 1912 – 1913 and 1951 – 2000.

MATTOLE RIVER NEAR PETROLIA, USGS #11469000 ANNUAL MINIMUM 7-DAY LOW-FLOW FREQUENCY ANALYSIS Water Years 1912 - 1913 and 1951 - 2000

	Statistics
Minimum 7-day Return Water Average Period Exceedance Statist	ical Moments of
otatist	Discharge
1 1977 17.0 93.07 0.989 0.011	
2 2000 19.0 33.41 0.970 0.030	
	an = 28.47
4 1971 20.0 14.64 0.932 0.068	
	V = 7.34
6 1988 20.9 9.37 0.893 0.107 7 1995 21.0 7.95 0.874 0.126 Variand	ce = 5.38E+01
7 1995 21.0 7.95 0.874 0.126 Variance 8 1986 21.3 6.89 0.855 0.145	Je = 5.36E+01
	w = 1.39
10 1973 21.9 5.45 0.817 0.183	
11 1994 22.3 4.94 0.797 0.203	
12 1965 23.0 4.51 0.778 0.222	
13 1981 23.0 4.15 0.759 0.241	
14 1987 23.1 3.84 0.740 0.260	
15 1964 23.6 3.58 0.721 0.279	
16 1957 23.9 3.35 0.701 0.299 17 1989 23.9 3.15 0.682 0.318	
17 1989 23.9 3.15 0.682 0.318 18 1951 24.4 2.97 0.663 0.337	
19 1956 24.9 2.81 0.644 0.356	
20 1975 25.3 2.66 0.625 0.375	
21 1952 25.4 2.54 0.606 0.394	
22 1992 25.4 2.42 0.586 0.414	
23 1985 25.6 2.31 0.567 0.433	
24 1982 26.3 2.21 0.548 0.452	
25 1980 26.6 2.12 0.529 0.471	
26 1972 27.6 2.04 0.510 0.490 27 1974 27.6 1.96 0.490 0.510	
28 1959 27.7 1.89 0.471 0.529	
29 1967 28.1 1.82 0.452 0.548	
30 1976 28.3 1.76 0.433 0.567	
31 1984 28.4 1.71 0.414 0.586	
32 1996 29.1 1.65 0.394 0.606	
33 1991 29.4 1.60 0.375 0.625	
34 1990 29.9 1.55 0.356 0.644	
35 1955 30.0 1.51 0.337 0.663 36 1983 30.7 1.47 0.318 0.682	
36 1983 30.7 1.47 0.318 0.682 37 1966 31.9 1.43 0.299 0.701	
38 1998 32.0 1.39 0.279 0.721	
39 1997 33.4 1.35 0.260 0.740	
40 1969 33.7 1.32 0.241 0.759	
41 1993 34.0 1.29 0.222 0.778	
42 1962 34.3 1.25 0.203 0.797	
43 1953 34.4 1.22 0.183 0.817	
44 1958 34.6 1.20 0.164 0.836	
45 1960 36.0 1.17 0.145 0.855 46 1978 36.4 1.14 0.126 0.874	
46 1978 36.4 1.14 0.126 0.874 47 1968 38.0 1.12 0.107 0.893	
48 1954 38.3 1.10 0.087 0.913	
49 1979 38.3 1.07 0.068 0.932	
50 1961 38.4 1.05 0.049 0.951	
51 1963 42.3 1.03 0.030 0.970	
52 1912 58.0 1.01 0.011 0.989	

Chart III-9: Annual minimum seven-day running average low-flow and the 5-year moving average for Mattole River near Petrolia, USGS station #11469000, for Water Years 1951 – 2000.

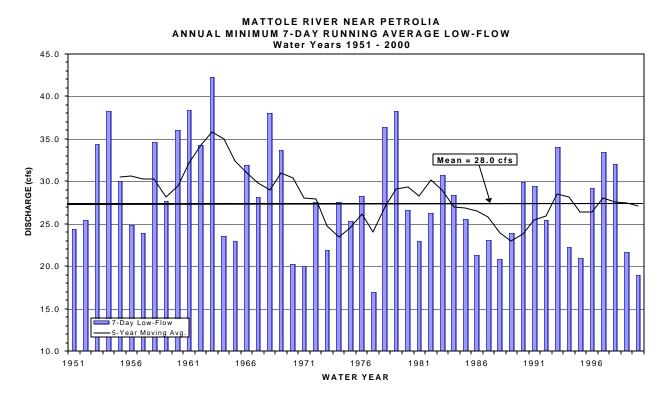
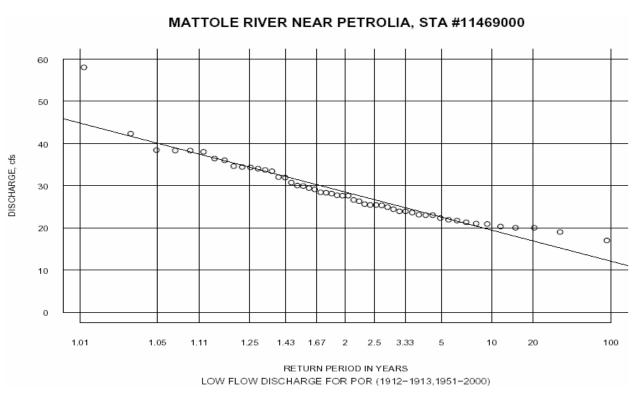


Chart III-10: Annual minimum seven-day running average low-flow return period for Mattole River near Petrolia, USGS station #11469000, for Water Years 1912 – 1913 and 1951 – 2000.



IV. SURFACE WATER RIGHTS AND WATER USE

California law recognizes various types of water rights to surface water flow. Their proof of existence and exercise can often be a complicated and controversial issue. Surface water diversions can have a major impact on streamflow and consequently fisheries habitat. Ground water extractions, with a few exceptions, are not subject to California law and can also affect streamflow. A description of the different types of surface water rights can be found at the SWRCB web site (www.waterrights.ca.gov). A more detailed description is published in an article in the Pacific Law Journal, Volume 19, and Issue 4, entitled "Overview of California Water Law" by William R. Atwater and James Merkle.

The two predominate types of water rights within the Mattole River Basin are riparian and appropriative. Riparian water rights generally apply to the diversion and use of surface water from a natural watercourse on lands that the watercourse passes through or borders. No California statute defines riparian rights and a State permit is not required, but a riparian water rights doctrine has been established in the State by decisions of the courts and confirmed by Section 3, Article XIV of the California Constitution.

Common restrictions and conditions that apply to all riparian water rights include: 1) the diversion of water is limited to natural flowing water as distinguished from return flows derived from the use of ground water, water seasonally stored and later released, or water diverted from another watershed; 2) a parcel of land losses its riparian right if it is severed from the land bordering the watercourse unless the right is reserved by deed for the severed parcel; 3) they are of equal priority with all other riparian rights to the same natural flow of a watercourse regardless of the date of initial use; 4) they are neither created by use nor lost by nonuse; 5) they can not be transferred to another parcel of land but can be dedicated to streamflow purposes; and 6) a "Statement of Water Diversion and Use" is required, with certain exceptions, to be filed periodically with the SWRCB. This statement establishes a record of actual water use.

Appropriative water rights generally apply to the diversion and use of water on lands that do not border the watercourse. Appropriative water rights are divided into two types, those initiated before December 19, 1914 (pre-1914) and those initiated after December 19, 1914 (post-1914).

Prior to enactment of the California Water Commission Act in December 1914, the appropriation of water from surface streams was obtained in accordance with the guidelines in Sections 1410 through 1422 of the California Civil Code of 1872. To appropriate water, it was necessary to post a notice at the proposed point of diversion and record a copy of the notice with the respective County Recorder. The right was considered valid as long as the appropriator maintained continuous beneficial use of the water. The amount that could be rightfully claimed was fixed by actual beneficial use as to both amount and season of diversion.

In 1914, the California Water Commission Act abolished the procedures previously followed for water appropriation, and established an application process. Water appropriation now requires compliance with the provisions of Division 2, Part 2 of the California Water Code. These provisions established the steps that must be followed to initiate and acquire an appropriative water right. The purpose of filing an application for a permit is to secure a right to the use of unappropriated water and to establish a record of the right so that its status relative to other rights may be determined.

A prospective appropriator must file an application with the SWRCB. The application includes all information pertinent to the development, acquisition, and use of the water, including point of diversion, diversion flow rates, time of diversion, quantity of diversion, and place and purpose of use. The application

is then reviewed by the SWRCB. The review process includes: 1) posting or publication of the application. If protests are received, a hearing or investigation is conducted; 2) availability of unappropriated water; 3) possible environmental impacts as required by the California Environmental Quality Act; and 4) possible fisheries impacts by the California Department of Fish and Game.

Although ground water extractions do not generally require a SWRCB application, underground water extractions from "subterranean streams flowing through known and definite channels" are under the SWRCB jurisdiction and are subject to the same review as surface water extractions.

If the application is approved, a permit is issued with terms and conditions to develop the diversion facilities. If the terms and conditions are completed and adhered to during a specific time frame, a license is issued limiting the water user to a quantity of water that was demonstrated as beneficially used during the permitting process. The terms and conditions set by the SWRCB normally apply after the license is issued.

Common conditions and restrictions that apply to all pre-1914 and post-1914 appropriative water rights include: 1) appropriation of water can be from the natural flow of a watercourse, return flows derived from the use of surface or ground water, water seasonally stored and later released, or water diverted from another watershed; 2) they can be transferred to other lands or for streamflow purposes; 3) they typically follow the "first in time, first in right" doctrine of priority among other appropriators but are inferior to riparian water rights - there may be times during the diversion season when no unappropriated water is available; 4) they can be lost after five years of nonuse; and 5) a "Statement of Water Diversion and Use" is required, with certain exceptions, to be filed periodically with the SWRCB. This statement provides a record of actual water use.

Disputes over the exercise of surface water rights occur and can occasionally only be resolved by court litigation. The SWRCB is authorized to pursue civil action if a water user violates the terms of a post-1914 appropriative water right, but does not have the authority to determine the validity of other vested water rights. The County Superior Courts are sometimes compelled to adjudicate water rights as a result of disputes that can not be resolved by other methods. A typical water right adjudication defines numerous aspects of the water rights involved including the quantity of use, priority to other vested water rights, point of diversion, and the purpose, place and season of use. Court adjudicated water rights do not currently exist within the Mattole River Basin.

A search of the SWRCB's Water Right Information Management System (WRIMS) was performed to determine the number and types of water rights within the Mattole River Basin. The WRIMS database is under development and may not contain all post-1914 appropriative water right applications that are on file with the SWRCB at this time. Some pre-1914 and riparian water rights are also contained in the WRIMS database for those water rights whose users have filed a "Statement of Water Diversion and Use". A list of water rights and associated information contained within WRIMS for the Mattole River Basin is presented in Table IV-1. A location map of the point of diversion is shown in Figure IV-1.

According to Table IV-1, SWRCB appropriative water right permits and statements of water use exist for a total of about 3,200 acre-feet per year (ac-ft/yr) of water from the Mattole River Basin, at a maximum diversion rate of about 4.4 cubic feet per second (cfs). The purpose of use of these water rights includes domestic, fire protection, irrigation, industrial, frost protection, recreation, stockwatering, and fish and wildlife enhancement.

DWR periodically conducts land and water use surveys within the basin for its Statewide Planning Program. Arial photographs at a scale of 1:24000 are used to identify land use types. Due to the mapping scale, only plots of land two acres or greater can be delineated. Crop type and water source are then determined or verified by field inspection. DWR uses this data to estimate agricultural water use during an average water supply year and future water use demands for each detailed analysis unit (DAU) of the State and publishes the information in the Bulletin 160 series entitled "The California Water Plan". DWR combines the Mattole and Bear River Basins into one DAU. The latest land use survey was conducted in 1996. Table IV-2 presents DWR irrigated agricultural acres, water source, and water use data for the Mattole River Basin portion of DAU #27 for 1996.

Table IV-2: Irrigated agricultural land, water source, and water use within the Mattole River Basin.

IRRIGATED	MATTOLE RIVER WATERSHED IRRIGATED AGRICULTURAL LAND AND WATER USE FOR YEAR 1996													
	Water Source Unit Applied Water Water Use (gross acres) (acre-feet per acre) (acre-feet per year)													
Crop	Ground	Surface	Total	Ground	Surface	Ground	Surface	Total						
Almonds	14	0	14	2.0	na	28	0	28						
Pasture - partial 1/	0	513	513	na	1.4	0	718	718						
Pasture - full 2/	71	0	71	2.0	na	142	0	142						
Truck - misc.	6	0	6	1.3	na	8	0	8						
Total	91	513	604	na	na	178	718	896						
Notes: 1/ Partially irrigated 2/ Fully irrigated														

Due to the steep mountainous terrain, surface water diversions for commercial irrigated agricultural purposes are relatively minor today and are expected to remain so in the future. However, water extraction for residential use appears to be growing within the basin. Many of these diversions likely occur at locations along the river and during the time of year where streamflow, and consequently fish habitat, is not significantly adversely affected. However, rural subdivisions have been developed within the upper basin where natural river flows are less abundant and small but numerous surface water extractions for small irrigation and domestic purposes can have a major impact on surface flows.

DFG and other fisheries restoration personnel have observed major and near total depletion of the river flow during the late summer and early fall months during dry years along reaches within the Southern subbasin upstream of the confluence with Mill Creek. This area is considered excellent fisheries habitat and any depletion can significantly affect the flow during low runoff periods downstream to Ettersburg and the confluence with Bear Creek. The Southern subbasin has many rural subdivisions located along the river and since groundwater supplies are limited, many residences and landowners extract water from the river for small irrigation and domestic purposes. Numerous post-1914 SWRCB issued appropriative water rights are located within the area (see Figure IV-1) and many riparian and pre-1914 water rights are probably being exercised as well.

To determine current potential water use by the permanent population of the Mattole River Basin, DFG personnel compiled Year 2000 population census data, then applied unit per capita water use factors from

the American Water Works Association and the EPA. Table IV-3 summarizes the results for each subbasin of the Mattole River Basin.

Table IV-3: Population and water use within the Mattole River subbasins.

	MATTOLE RIVER POPULATION WATER USE FOR YEAR 2000													
Population Number Daily Daily Annual														
	Permanent Area Density of Water Use Water Use													
Subbasin	basin Population (sq. mi.) (capita/sq. mi.) Households (gallons) (cfs) (acre-feet)													
Estuary	24	2	12.0	8.6	2,100	0.003	2.4							
Northern	200	98	2.0	71.7	17,500	0.027	19.6							
Western	297	89	3.3	106	26,000	0.040	29.1							
Eastern	405	79	5.1	145	35,500	0.055	39.7							
Southern														
Total	1,132	296	3.8	405.1	99,100	0.153	111.0							

Ninety percent of the Northern subbasin's total population lives within three miles of the communities of Petrolia and Honeydew. The Eastern subbasin has the most "pockets" of people. This is due to the numerous rural subdivisions in the area. This trait is shared with the Southern subbasin. The major difference is that the Southern subbasin populations are concentrated along the Mattole River and its major tributaries. Most of the Western subbasin population lives near the county roads running along its edge. These roads lie near the river from the estuary to Honeydew, and then generally follow the ridge-tops until reaching the boundary with the Southern subbasin.

Any water extraction from surface or groundwater supplies, depending on the amount, location, and season, can affect streamflow, water quality, and consequently fish habitat. The method of diversion of surface flows, such as dams and pumps without properly designed fish ladders or screens, can also impede and adversely affect all species of fish. Current low-flow constraints in the Mattole River will most likely prohibit future additional appropriative water right allocations issued by the SWRCB. However, existing legal water right and the probable illegal extraction of surface water has apparently significantly affected streamflow during low runoff periods in certain tributaries and reaches of the river. A surface water diversion monitoring program should therefore be considered as part of any watershed management or fish restoration program.

Table IV-1: List of SWRCB Water Right Information System surface water rights.

MATTOLE RIVER BASIN

LIST OF WATER RIGHTS CONTAINED IN THE STATE WATER RESOURCES CONTROL BOARD WATER RIGHT INFORMATION MANAGEMENT SYSTEM (WRIMS) DATABASE

Page 1 of 2

\dashv	1/	2/	3/	Application	Application	Dor!4	Dor:	Linguage	Liesass
-	WRIMS ID	Owner	Type	Application Number	Application Date	Permit Number	Permit Date	License Number	<u>License</u> Date
_	WKING ID	Owner	туре	Number	Date	Number	Date	Nullibei	Date
1	A005154	John Cousins	Α	005154	8/13/26	002639	10/8/26	001164	3/29/32
2	A007179	Larry Bacchetti	A	007179	1/25/32	003874	4/4/32	001504	11/19/34
3	A008049	Lola Moore	A	008049	8/3/34	004441	12/8/34	002077	8/29/40
4	A011527	Lee French	A	011527	8/26/46	006703	2/20/47	003500	4/30/52
5	A012531	Richard French	A	012531	6/2/48	007231	12/27/48	003779	7/29/53
6	A012768	Redwood Abbey Inc.	A	012768	10/28/48	007541	10/25/49	006198	3/7/61
7	A012768			012768	10/28/48	007541	10/25/49	006198	3/7/61
8	A012768	-		012768	10/28/48	007541	10/25/49	006198	3/7/61
9	A012908	John Klingenspor	A A	012908	1/24/49	007595	11/28/49	005350	8/20/58
10	A014256	Chambers Cattle Co.	Α	014256	4/16/51	008710	8/27/51	006427	2/26/62
11	A014509	Alexander Cockburn	A	014509	10/4/51	008940	4/25/52	006433	2/23/62
12	A014538	North Fork Ranch	Α	014538	10/29/51	008925	3/14/52	004564	2/17/57
13	A014594	Mary Lou Chambers-Morgan	A	014594	12/7/51	009198	11/28/52	004914	12/31/57
14	A015116	Joe Yonts	Α	015116	12/12/52	009351	4/6/53	005223	6/18/58
15	A016173	Jacqueline Volk	Α	016173	1/28/53	009374	5/4/53	007063	11/6/64
16	A015220	North Fork Ranch	Α	015220	3/3/53	009430	6/29/53	004565	2/25/57
17	A016654	Jim Wilson	Α	016654	10/10/55	010446	6/25/56	006306	6/2/61
18	A016684	CA Dept of Forestry	Α	016684	10/21/55	010465	10/9/56	006252	4/12/61
19	A021479	John Sheek	Α	021479	9/30/63	014304	4/3/64	008878	1/31/69
20	A021859	Orville Sholes	Α	021859	7/27/64	014664	3/9/65	008904	2/7/69
21	A021937	U. S. Bureau of Land Mgmt.	Α	021937	10/15/64	014679	4/1/65	009536	1/14/71
22	A021938	U. S. Bureau of Land Mgmt.	Α	021938	10/15/64	014680	4/1/65	009537	1/14/71
23	A022574	Robert McKee	Α	022574	9/13/66	015316	4/21/67	009853	12/29/71
24	A023145	Stanwood Schmidt	Α	023145	10/2/68	015798	2/7/69	009756	5/3/71
25	A023291	Richard Scheinman	Α	023291	6/12/69	015904	10/17/69	010977	4/4/80
26	A023295	County of Humboldt	Α	023295	6/13/69	015935	11/7/69	011155	9/21/81
27	A023760	Mayme Cook	Α	023760	4/14/71	016289	9/20/71	010548	12/31/75
28	A023803	Larry Bacchetti	Α	023803	6/8/71	016414	5/5/72	011103	3/24/81
29	A023936	So. Humb. Unified Sch. Dist.	Α	023936	12/3/71	016417	5/12/72	010721	9/3/76
30	A024636	Alan Trombetta	Α	024636	7/5/74	016835	11/16/76	011215	4/22/82
31	A024832	Sage Koenig	Α	024832	7/3/75	017066	2/6/78	012029	11/12/86
32	A026087	Fredrick Liu	Α	026087	9/13/79	018098	11/3/80	012518	3/16/90
33	A026153	James Phillips	Α	026153	12/26/79	017970	8/15/80	011825	12/30/85
34	A026270	Lola Moore	Α	026270	3/31/80	018117	11/26/80	012289	3/11/88
35	A026751	So. Humb. Unified Sch. Dist.	Α	026751	3/13/81	018464	3/26/82	012277	3/10/88
36	A027862	U. S. Bureau of Land Mgmt.	Α	027862	9/12/83	019269	7/19/84	none	na
37	A028113	U. S. Bureau of Land Mgmt.	Α	028113	4/12/84	019269	7/19/84	none	na
38	A028524	Keith Chittenden	Α	028524	8/1/85	020003	1/29/87	none	na
39	A030424	Karen Ruth	Α	030424	1/11/95	020957	3/4/98	none	na
40	A030424	Karen Ruth	Α	030424	1/11/95	020957	3/4/98	none	na
4.4	Doggood	Diena Deeli		0200000	10/0/00	m -		0000000	40/07/00
41	D029833R	Diane Paoli	D	029833R	10/3/90	na	na	000080R	12/27/90
42	D030598R	Doris Ogden	D	030598R	3/11/97	na	na	000318R	5/13/97
43	D030604R	John Jennings	D	030604R	4/4/97	na	na	000319R	5/21/97
44	S004939	Dipolo Cabalase	S	004939	1/1/70	na	na	na	na
45	S004939 S005803	Richard Wohlers	S	004939	1/1/70	na	na	na	na
46	S005603 S006452	Mary Fishman	S	005603	1/1/74	na	na	na	na
τU	S000432 S009209	Roger Safier	S	009209	4/20/77	na	na	na	na
17	JUUJZUJ	INUGEI GAIIEI	J					IIa	IIa
47 48		Keith Chittenden	S	012223	7/29/85	ทล	ทล	กล	na
47 48 49	S012223 S013558	Keith Chittenden U. S. Bureau of Land Mgmt.	S	012223 013558	7/29/85 3/13/91	na na	na na	na na	na na

Notes: 1/ State Water Resources Control Board water right identification

^{2/} Current WRIMS owners name. May not be current owner of property.

^{3/} A = SWRCB appropriative water right, D = small domestic registration,

S = pre-1914 appropriative water right or riparian water right

Table IV-1: List of SWRCB Water Right Information Management System surface water rights (continued).

MATTOLE RIVER BASIN

Page 2 of 2

LIST OF WATER RIGHTS CONTAINED IN THE STATE WATER RESOURCES CONTROL BOARD WATER RIGHT INFORMATION MANAGEMENT SYSTEM (WRIMS) DATABASE

		1		Maximum Annual		2/	3/	
	1/		Tributary	Diversion Volume	Maximum	Purpose	POD	
	WRIMS ID	Source	То	(acre-feet / year)	Diversion Rate	of Use	Location	County
				, ,			•	
1	A005154	unnamed stream	Mattole R.	(no data)	8,400 gpd	D, I	SE NW, 30, 2S, 1W, H	Humboldt
2	A007179	unnamed spring	Mattole R.	(no data)	4,500 gpd	D, I	SW NE, 30, 2S, 1W, H	Humboldt
3	A008049	Mattole R.	Pacific Ocean	(no data)	175 gpd	D	SW NW, 30, 2S, 1W, H	Humboldt
4	A011527	Bear Cr.	Mattole R.	(no data)	0.17 ds		NW NW, 7, 4S, 2E, H	Humboldt
5	A012531	Notley Cr.	Bear Cr.	(no data)	0.083 cfs	D, I	NE NE, 14, 4S, !E, H	Humboldt
6	A012768	Mattole R.	Pacific Ocean	(no data)	0.08 cfs	D, I	SW SE, 22, 5S, 2E, H	Mendocino
7	A012768	Mattole R.	Pacific Ocean	(no data)	0.08 cfs	D, I	NW SE, 22, 5S, 2E, H	Mendocino
8	A012768	Thompson Cr.	Mattole R.	(no data)	0.08 cfs	D, I	SE SW, 22, 5S, 2E, H	Mendocino
9	A012908	unnamed stream	Mattole R.	(no data)	1,000 gpd	D	SE SE, 11, 2S, 2W, H	Humboldt
10	A014256	Mattole R.	Pacific Ocean	(no data)	0.89 cfs		NE NW, 10, 2S, 2W, H	Humboldt
11	A014509	Mattole R.	Pacific Ocean	(no data)	0.12 ds	<u> </u>	SW SE, 11, 2S, 2W, H	Humboldt
12	A014538	N. F. Mattole R.	Mattole R.	(no data)	0.43 dfs	<u> </u>	SE SE, 33, 1S, 2W, H	Humboldt
13	A014594	Mill Cr.	Mattole R.	(no data)	0.035 cfs	<u> </u>	NW NE, 10, 2S, 2W, H	Humboldt
14	A015116	Mattole R.	Pacific Ocean	(no data)	0.35 ds	!	NE NW, 30, 2S, 1W, H	Humboldt
15	A016173	Mattole R.	Pacific Ocean	(no data)	0.07 dfs	<u>D, I</u>	SW NW, 15, 5S, 2E, H	Humboldt
16	A015220	N. F. Mattole R	Mattole R.	(no data)	0.82 dfs		NE SE, 26, 1S, 2W, H	Humboldt
17	A016654	Mattole R.	Pacific Ocean	(no data)	0.36 cfs		SE NW, 2, 3S, 1W, H	Humboldt
18	A016684	Mattole R.	Pacific Ocean	(no data)	1,800 gpd	D	SW NE, 5, 5S, 2E, H	Humboldt
19 20	A021479 A021859	Honeydew Cr.	Mattole R.	(no data)	0.02 dfs 3.000 apd	<u>I</u> D. I	NE NW, 18, 3S, 1E, H	Humboldt Humboldt
21	A021839 A021937	Mattole R.	Pacific Ocean	(no data)	50 gpd	D, I	SE SW, 24, 2S, 2W, H SW NE, 8, 4S, 1E, H	Humboldt
22	A021937 A021938	Primitive Spring	unnamed stream	(no data)	100 apd	D D	NW NE, 21, 4S, 1E, H	Humboldt
23	A021936 A022574	Horse Mt. Spring Mattole R.	unnamed stream Pacific Ocean	(no data) (no data)	3,900 gpd	<u> </u>	NW NW, 5, 5S, 2E, H	Humboldt
24	A022374 A023145	unnamed stream	Mattole R.	(no data)	0.046 cfs	D.I.S	SE NW, 25, 2S, 2W, H	Humboldt
25	A023140	unnamed spring	unnamed stream	(no data)	100 apd	D, 1, 0	SW NE, 16, 2S, 2W, H	Humboldt
26	A023295	unnamed stream	Mattole R.	8.8	17,000 gpd	D.I	NW SW, 30, 2S, 1W, H	Humboldt
27	A023760	Mattole R.	Pacific Ocean	(no data)	0.53 ds	J.	SW SW, 3, 2S, 2W, H	Humboldt
28	A023803	Squaw Cr.	Mattole R.	(no data)	0.066 cfs	i	SW NE, 30, 2S, 1W, H	Humboldt
29	A023936	Mattole R.	Pacific Ocean	(no data)	1,000 apd	D	SW NW, 15, 5S, 2E, H	Humboldt
30	A024636	unnamed spring	unnamed stream	(no data)	550 apd	D, E	NE NW, 3, 4S, 1E, H	Humboldt
31	A024832	Mattole R. under flow	Pacific Ocean	(no data)	0.07 cfs	E.I	NE SE, 36, 3S, 1E, H	Humboldt
32	A026087	unnamed stream	Mattole R.	(no data)	1,400 gpd	I	NW SW, 30, 2S, 1W, H	Humboldt
33	A026153	Gibson Cr.	Mattole R.	0.2	200 apd	D	SW NW, 15, 5S, 2E, H	Humboldt
34	A026270	unnamed stream	Mattole R.	0.2	450 apd	D	NW SW, 30, 2S, 1W, H	Humboldt
35	A026751	unnamed spring	unnamed stream	0.7	1,500 gpd	D	NW NW, 8, 4S, 2E, H	Humboldt
36	A027862	Dandy Springs	Mattole R.	(no data)	4,000 gpd	D, E, S	SE SE, 13, 2S, 3W, H	Humboldt
37	A028113	unnamed spring	unnamed stream	0.1	(no data)	E, R, S, W	NE NE, 24, 2S, 3W, H	Humboldt
38	A028524	unnamed spring	Blue Slide Cr.	1.3	2,000 gpd	J	NW SW, 33, 3S, 12E, H	Humboldt
39	A030424	Mattole R.	Pacific Ocean	22.1	4,090 gpd	D, I, N	NE NE, 6, 5S, 2E, H	Humboldt
40	A030424	unnamed creek	Mattole R.	22.1	4,090 gpd	D, I, N	SE SW, 32, 4S, 2E, H	Humboldt
L.	Bassass-		5 17 0					
41	D029833R	Mattole R.	Pacific Ocean	0.5	446 gpd	D	SW NE, 6, 4S, 2E, H	Humboldt
42	D030598R	Mattole R.	Pacific Ocean	1	4,500 gpd	(no data)	SW SW, 33, 4S, 2E, H	Humboldt
43	D030604R	Mattole R.	Pacific Ocean	(no data)	4,500 gpd	D	SW SW, 33, 4N, 2E, H	Humboldt
	000 1000	M-u. S	D:	(1 ·)	0.045 /		014/484/00 00 414/11	Theres III
44	S004939	Mattole R.	Pacific Ocean	(no data)	0.045 cfs	I	SW NW, 30, 2S, 1W, H	Humboldt
45	S005803	unnamed creek	Mattole R.	(no data)	(no data)	D, I, S	SE NW, 25, 2S, 2W, H	Humboldt
46	S006452	unnamed spring	unnamed stream	(no data)	(no data)	D, I, S	SW NW, 16, 4S, 2E, H	Humboldt
47	S009209	Stansberry Cr.	Mattole R. unnamed stream	(no data)	(no data)	<u>I, S</u>	NW, 20, 2S, 2W, H NW SW, 33, 3S, 2E, H	Humboldt Humboldt
48 49	S012223 S013558	unnamed spring Bridge Cr.	unnamed stream Mattole R.	(no data) (no data)	4,300 gpd 14,400 gpd	D D	NW NW, 5, 5S, 2E, H	Humboldt Humboldt
50	S013558 S014314	Mattole R.	Pacific Ocean	(no data)	0.19 dfs	(no data)	NE NE, 6, 5S, 2E, H	Humboldt
50	3014314	IVIANUIC N.	r'auliu Oudal I	(110 Uala)	0.19 05	(HU Uald)	INL INE, U, US, ZE, IT	HUHIDOIGL

Notes: 1/ State Water Resources Control Board water right identification

^{2/} D = domestic, E = fire protection, I = irrigation, J = industrial, N = frost protection, R = recreation, S= stockwatering,

W = fish & wildlife protection or enhancement

^{3/} Point of diversion location. Quarter-Quarter Section, Section, Township, Range, Base & Meridian (M = Mount Diablo; H = Humboldt)

